

Analysis of VWP Individual Permit No. 08-0572

July 29, 2008

Charlotte Court House



TCRC Concerns with Permit

1. Public water withdrawal

- 12.5MGD vs. 24.9MGD

2. Public safety in project

- SML MFRDD, USCG Aux, WSC inputs not considered
- “Personal risk decision to live on lake”

3. Recreation in and below the project

- Failure to consider alternatives
- Clear bias for flow augmentation
- Little consideration of project recreational impacts

4. Fishery

- Autocycle vs. Continuous Release
- Inconsistency between VDGIF targets and hydrology
- Unequal consideration of all species and life-stages

3. Recreation In & Below the Project



Downstream Stakeholders Comments on Relicensing November 20, 2007

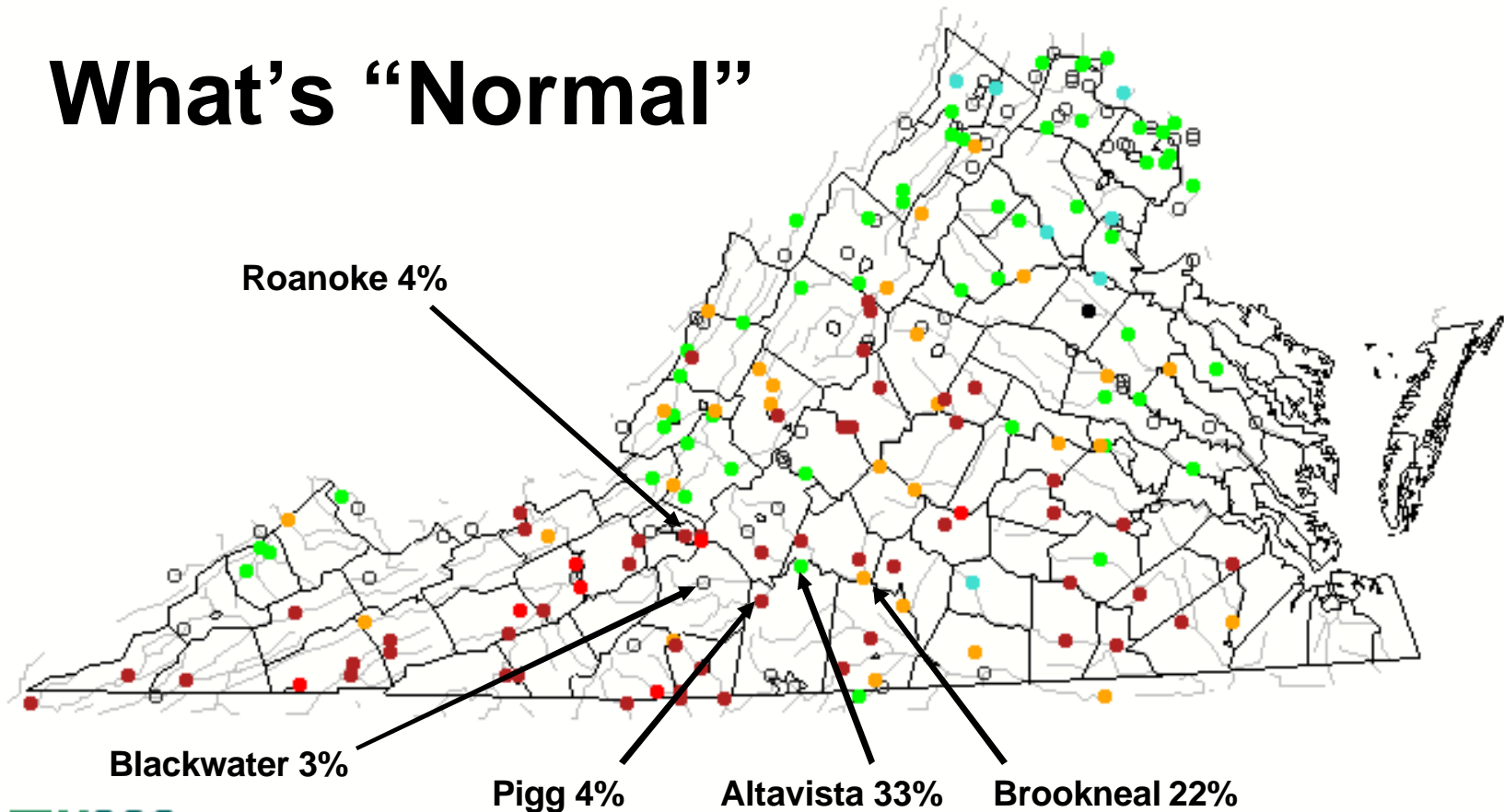
... we are concerned about drought management, that drought management protocols be reserved only for authentic drought events, and that in normal years adequate flow be preserved in the river for all downstream beneficial uses, including canoe recreation in the scenic river corridor & access to the fishery by boat. **“Authentic” Drought; What is considered “Normal”**

Our best estimate is that flows of 800-850 cfs as measured at the Brookneal USGS Gage are essential for canoeing. Below that flow riparian recreation effectively ends, along with public access to the fishery since there are very few public access points along the river. **Partial Agreement**

Pre-regulation annual 30 day low flows @ Brookneal (1925-61) had a median of 808 cfs, with a mean of 835 cfs. Both the median & the mean should be the norm under regulation, with drought flow regimes expected to occur approximately 10-20% of years, based on past record. **Partial Agreement**

Monday, July 28, 2008 06:30ET

What's "Normal"



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

River Recreation without Augmentation

Probability of Flows Greater than or Equal to 850cfs at Brookneal

Jun	Jul	Aug	Sep
79%	65%	50%	46%

Probability of Flows Greater than or Equal to 800cfs at Brookneal

Jun	Jul	Aug	Sep
82%	72%	55%	50%

Basin's Hydrology @ Brookneal

← DRY Year ↔ Normal Year →

	10th Percentile				25th Percentile				50th Percentile		
	Leesville Release	Brookneal Flow	Expected Brookneal Flow		Leesville Release	Brookneal Flow	Expected Brookneal Flow		Leesville Release	Brookneal Flow	Expected Brookneal Flow
Jan	433	870	870		755	1350	1350		1224	2050	2050
Feb	554	1050	1050		922	1600	1600		1492	2450	2450
Mar	721	1300	1300		1090	1850	1850		1693	2750	2750
Apr	694	1260	1260		972	1675	1675		1492	2450	2450
May	487	950	950		755	1350	1350		1157	1950	1950
Jun	265	620	755		487	950	950		755	1350	1350
Jul	138	430	692		319	700	781		554	1050	1050
Aug	68	325	657		219	550	732		453	900	900
Sep	44	290	646		185	500	715		386	800	814
Oct	118	400	682		252	600	748		453	900	900
Nov	219	550	732		353	750	750		654	1200	1200
Dec	312	690	778		487	950	950		922	1600	1600

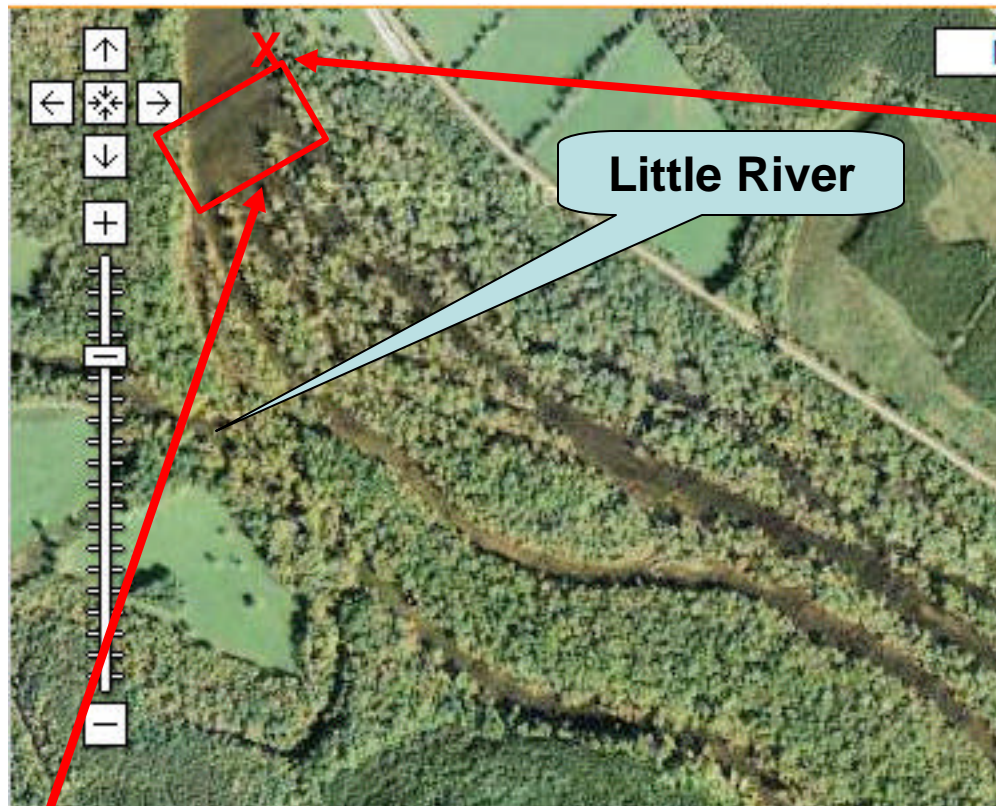
Downstream Stakeholders Comments on Relicensing November 20, 2007

... there are specific mitigation steps downriver that would help greatly in dealing with past & present negative effects of the dam & its management,

1. remove the logjam @ the northernmost sluice @ Long Island Park to allow easier passage by canoe through Hale Islands and keep that sluice cleared should the logjam re-establish itself. The rock formations at Hale Islands in the remaining passages are a real barrier to canoe navigation, even when the Brookneal Gage is @ 850 or above. ... This millrace sluice, when the logjam is not in place (as it has been now for several years), is by far the most easily navigated passage through Hale Islands; the logjam is effectively restricting canoe access at the Long Island Park, the place where public access is currently most important.

Partial Agreement

- Opening “Millrace Sluice” alternative to augmented releases
- What is Canoe Zero?



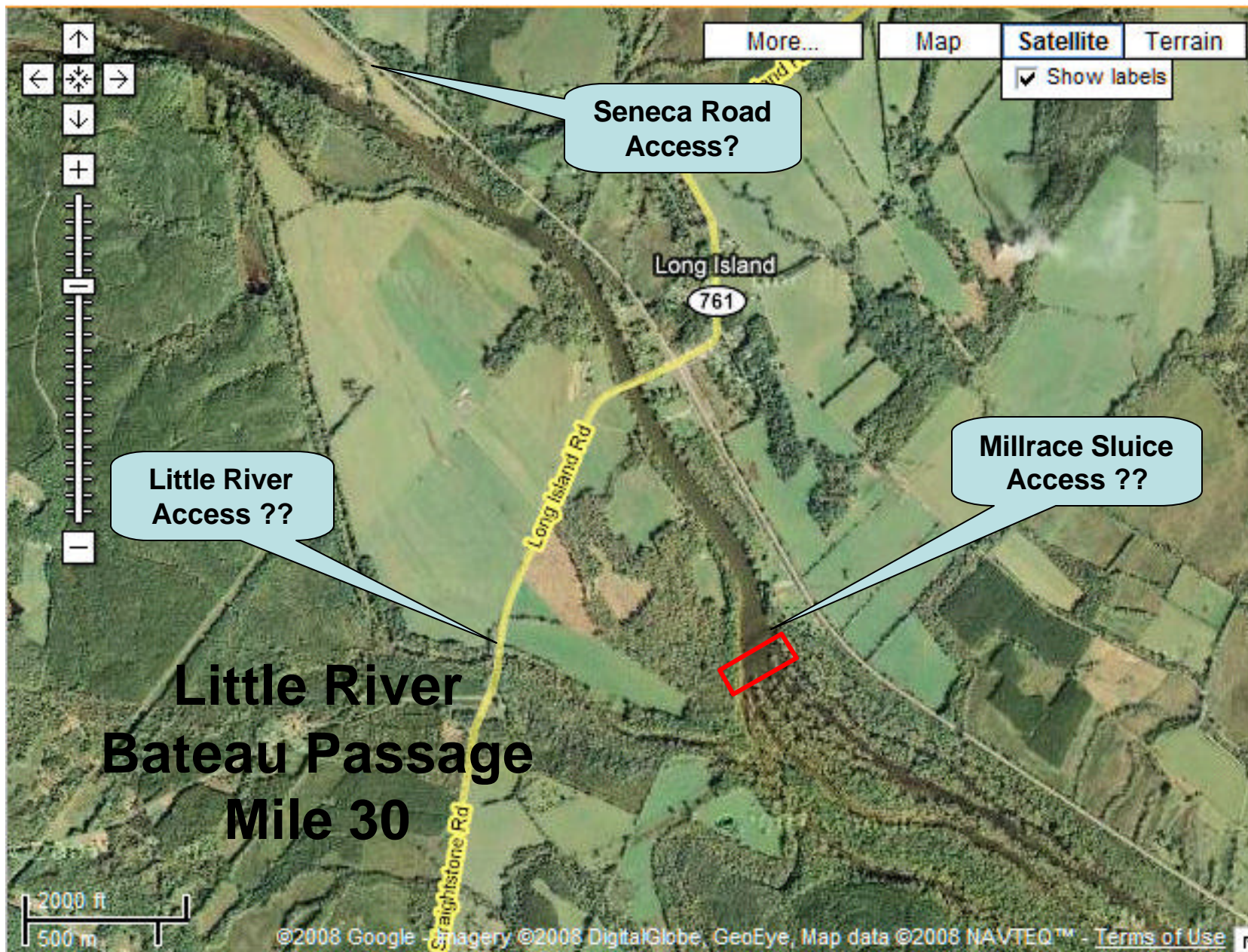
Downstream Stakeholders Comments on Relicensing November 20, 2007

2. increase public access points along the river. ...currently public access points @ Altavista (10 miles below the dam), Long Island (30 miles below the dam), Brookneal (41 miles below the dam), Clarkton (47 miles below the dam), and Mount Laurel & Clover (50+ miles below the dam)

There remains a critical need for access:

1. @ Leesville (both at the dam and at the village, near the mouth of Goose Creek, about 5 miles below the dam)
2. at Taber (approximately 20 miles below the dam & midway between the Altavista & Long Island access points)
3. on the Little River Channel @ Long Island (the south channel which the bateaux historically navigated & therefore of historic interest, of unique character, more easily navigable at low flows because of the historic instream navigational enhancements)
4. at Melrose (immediately above the most interesting complex of rapids in the river & tremendously popular with the public)

Agreed – This has not been aggressively pursued as an alternative to augmented releases





4. Fishery



Downstream Stakeholders Comments on Relicensing November 20, 2007

... the new license should establish absolute minimum releases from Leesville Dam that are more protective than the current license. The current permit provides for an instantaneous minimum release of 60 cfs, with a weekly minimum of 650 cfs. ... The 1981-82 Roanoke River Low Flow Study Report, by Paylor, Gregory, Shelor, & Ayers (SWCB) formally recommended that releases should never again go below **400 cfs during warm weather**, & never below **350 cfs at other times**.

Agreed:

- **New License should require Daily Average Flow**
- **Paylor, Gregory, Shelor, & Ayers release minimums are reasonable**

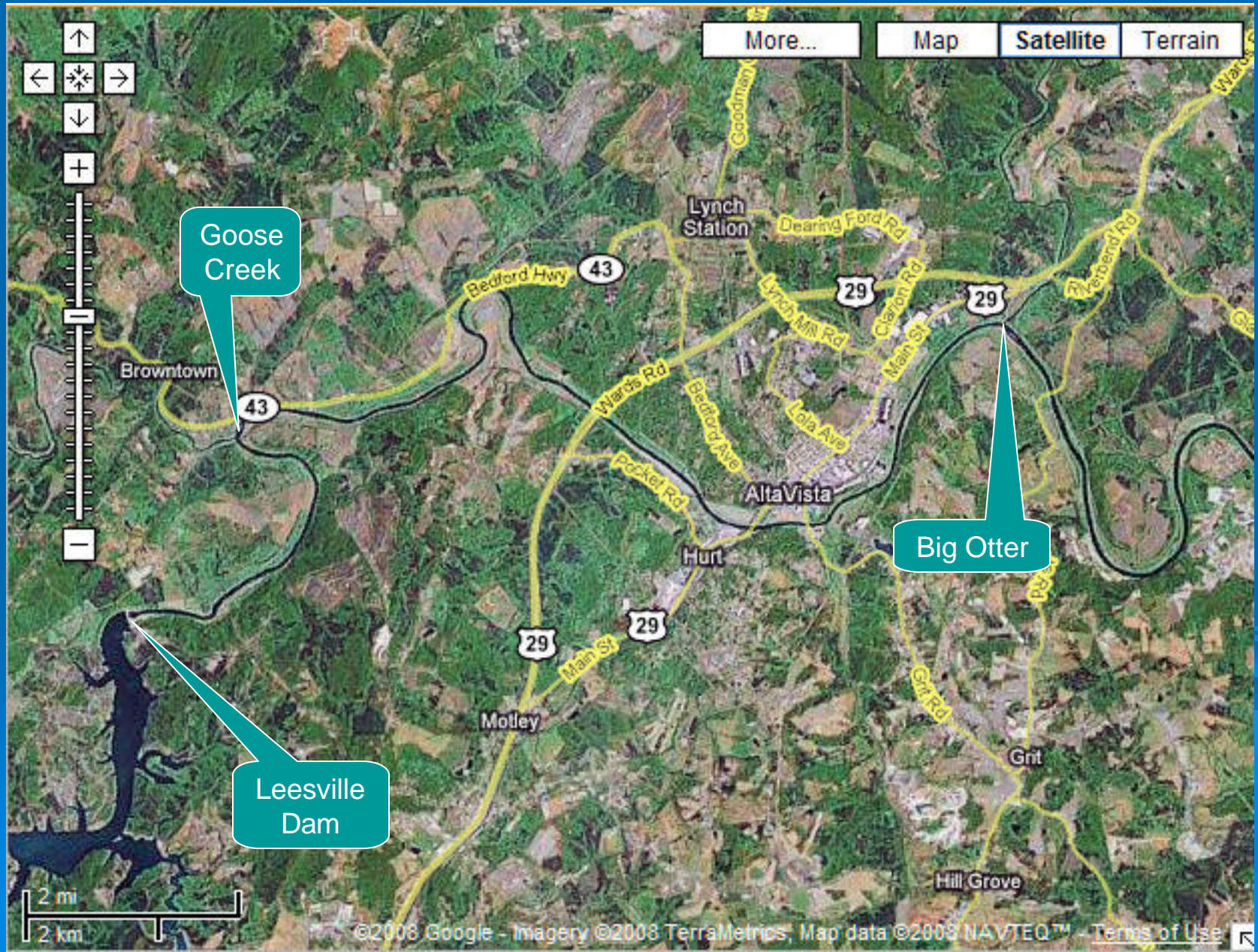
Downstream Stakeholders Comments on Relicensing November 20, 2007

- ... While autocycle operation has greatly diminished the damaging fluctuations at Altavista & downriver, the area in the proximity of the dam continues to experience considerable fluctuations every two hours.
- ... the fluctuations continue to have negative effects in proximity to the dam, especially in that area from the dam down to the mouth of Goose Creek. The solution is obvious" install a new turbine generator at Leesville Dam which allows for continuous release of an even stream of water in a natural pattern.
- ... We are appalled at the casual manner in which the preliminary licensing proposal minimizes the ill effects of the current autocycle operations in the reach of river in proximity to the dam.

Agreed:

- **Permit should require continuous release at Leesville**
- **Consider Log Perch populations in the Goose & Otter**

Area of Influence



Downstream Stakeholders Comments on Relicensing November 20, 2007

... we applaud the protocols which protect and enhance the striped bass spawn in the Staunton River. This is not only important to VDGIF, but also to the riparian community both recreationally and economically.

Partially Agree – So long as enhanced spawning flows do no harm to the fishery.



HL_8 Alters Rivers Hydrology

Brookneal

	Augment	Align	Recharge	Drawdown
Jan	25%	55%	20%	-5%
Feb	11%	19%	70%	59%
Mar	2%	10%	88%	86%
Apr	12%	81%	7%	-5%
May	40%	50%	10%	-30%
Jun	60%	35%	5%	-55%
Jul	77%	20%	3%	-74%
Aug	90%	10%	0%	-90%
Sep	75%	25%	0%	-75%
Oct	55%	45%	0%	-55%
Nov	20%	77%	3%	-17%
Dec	25%	75%	0%	-25%

Species of Interest June -- October

"... habitat data collected during the instream flow study indicates that a run of the river operating protocol during periods of low inflow would result in a 60-90% loss of habitat below the Trigger 2 "floors" for most species." -- VDGIF

Species and life stages that GAIN habitat at or below the 10% flow:

1. Walleye--Juvenile and adult stages see maximum habitat at flows below the 10th percentile flow
2. Channel Catfish-- Jun/July spawn habitat maximizes at the 10th percentile flow
3. American Shad--larvae and juvenile stages maximize habitat at or below the 10th percentile flow
4. Smallmouth Bass--all life stages maximize at or below the 10% flow
5. Northern Hogsucker--YoY maximize habitat at or below the 10% flow
6. Chub--spawn & adult stages maximize habitat at or below the 10% flow
7. Sunfish--all life stages maximize habitat at or below the 10% flow
8. Red Horse--juveniles and YoY maximize habitat near the 10% flow
9. Quillback--YoY maximize at of below the 10% flow

Species and life stages that LOSE habitat at the 10% flow:

1. Channel Catfish--juvenile stage loses about 54% of maximum available habitat; adult stages show 29% reduction from peak
2. Northern Hogsucker--adult stage habitat is 13% less than maximum available
3. Red Horse--adults see a 15% reduction from maximum habitat, except for Shorthead Redhorse adult which loses 42% from peak.

Other Areas of Agreement



Downstream Stakeholders Comments on Relicensing November 20, 2007

... we appreciate the adjustment in flood management which AEP made per the historic 1988 agreement. The evacuation of excess waters from the lakes prior to that time had resulted in unnatural hydrographs, with extended submersion of the riparian floodplain. The new regime of evacuating below full bank prevents the prolonged submersion, which resulted in killing crops, grasslands, & other vegetation, increased erosion, and prolonged lack of access to our unnaturally flooded lands.

Agreed:

- **Results in occasional flooding within the project**
- **Flood above 800 ft contour APCo & ACOE are liable**

Permit Language

- C. Standard Project Conditions
- 1. The activities authorized by this permit shall be executed in such a manner that any impacts to stream beneficial uses are minimized. As defined in § 62.1-10(b) of the Code, "beneficial use" means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural, electric power generation, commercial, and industrial uses. Public water supply uses for human consumption shall be considered the highest priority.
- 2. Flows downstream of the project area shall be maintained to protect all uses.

Summary

1. **Public water withdrawal**
 - 12.5MGD vs. 24.9MGD
2. **Public safety in project**
 - SML MFRDD, USCG Aux, WSC inputs not considered
 - “Personal risk decision to live on lake”
3. **Recreation in and below the project**
 - Failure to consider alternatives
 - Clear bias for flow augmentation
 - Little consideration of project recreational impacts
4. **Fishery**
 - Autocycle vs. Continuous Release
 - Inconsistency between VDGIF targets and hydrology
 - Project required to replace decreased side flow and accretion
 - Numerous issues with ISFN study interpretation
 - VDGIF... believes that a run-of-river release protocol for the Roanoke River would be very detrimental to the aquatic life that has developed in the river over the 45 years
 - Imbalanced consideration of all species and life-stages
 - Loss of Habitat vs. Change in Habitat

TCRC Asks ...

- State Agency principals and their management meet to review TCRC concerns and analysis of permit.
- Stakeholders should attend
- Delay DEQ Public Hearing until after this meeting
- VRRBAC support above recommendations



Back Up Slides



Downstream Stakeholders Comments

on Relicensing November 20, 2007

Negative effects of the upstream impoundment ...

1. Interruption of free fish passage

Agreed

2. Interruption of natural flood patterns

Agreed -- ACOE agreement with APCo to protect downstream

3. Ill effects of peak releases through Leesville Dam, with attendant soil erosion along the banks, resulting in widening of the river, loss of land, sedimentation of the aquatic habitat, & loss of the fishery. These ill effects have been greatly ameliorated in the further downstream reaches, but continue to persist in proximity to the dam, even with autocycle operation.

Agreed, and why have our State Agencies agreed to allow autocycle operations to continue ?

Downstream Stakeholders Comments

on Relicensing November 20, 2007

Negative effects of the upstream impoundment ...

4. Interception & entrapment of montane sediments which were formerly deposited on the riparian floodplain **Agreed – The project has trapped 80,000 acre feet and protected downstream from devastating flooding**
5. Loss of water from the riparian system due to lake surface evaporation
Incorrect – Lake surface traps more rainfall than evaporation.
River evaporation?
6. Safety issues due to rapidly fluctuating water levels **???**
7. Devastation of the fishery 1962-88 (due to chronic low flows 1962-66 as the project was being filled & recurring low flows 1966-88 due to peaking operations through Leesville Dam)

Agreed – Halt autocycle operations

Actual or Adjusted

Last Updated 28-JUL-2008 06:05 EST.

Project	Normal Full Pond	Forebay Actual (Feet)	Tail Water (Feet)	Tail Water Flow (CFS)	Adjusted Elevation
Project	Normal Full Pond	Forebay Actual (Feet)	Tail Water (Feet)	Tail Water Flow (CFS)	Adjusted Elevation

Roanoke River

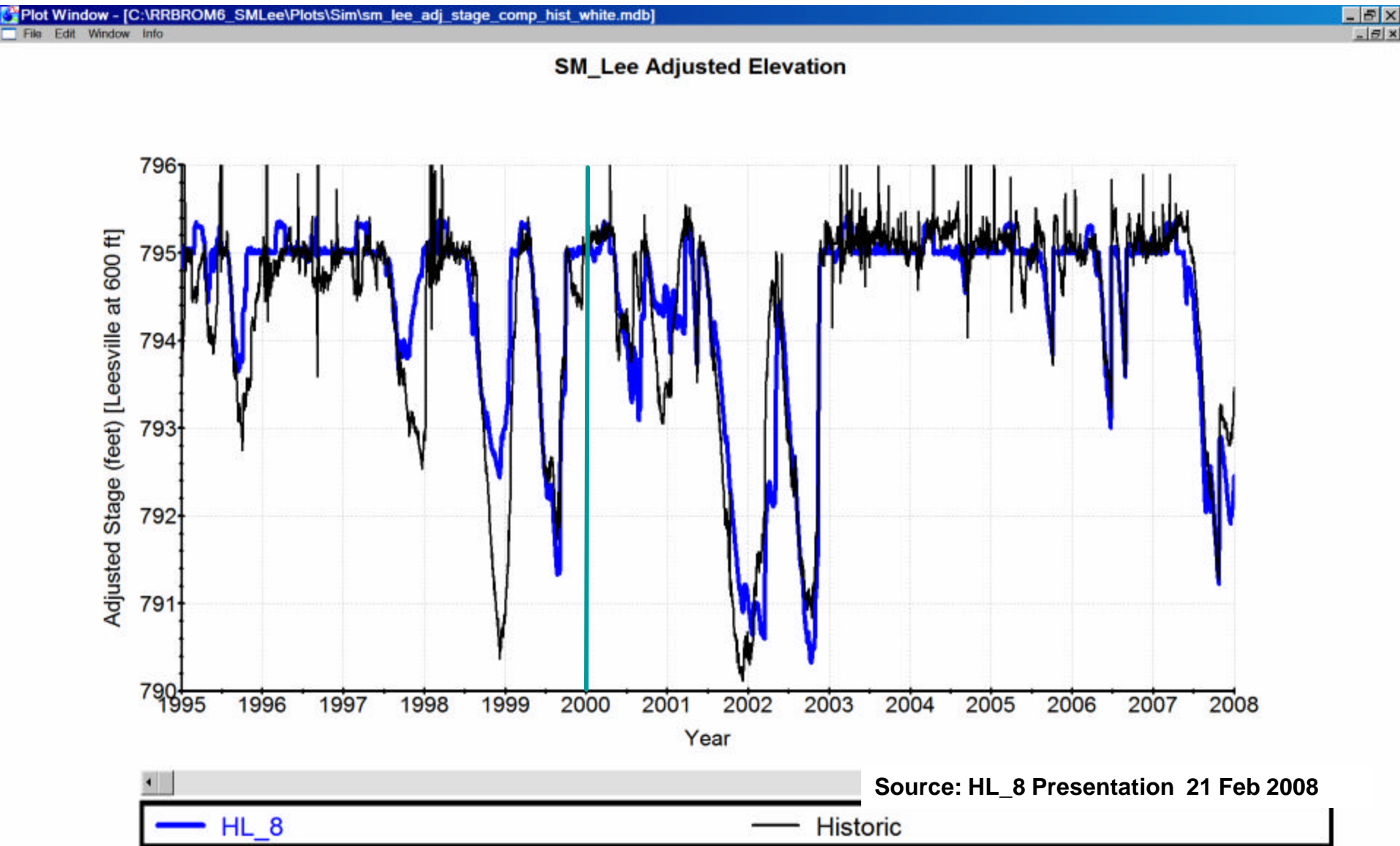
Niagara	885.00	884.73			
Smith Mountain	795.00	792.31	603.48		793.18
Leesville	613.00	606.54	531.98		

AS OF 06:00 THIS MORNING (07/26/2008), INFLOW TO THE SMITH MOUNTAIN PROJECT WAS **250 CFS** AND DISCHARGE FROM LEESVILLE **663 CFS**. THE ADJUSTED RESERVOIR ELEVATION WAS 793.18 FT. THE FLOW AT THE USGS GAUGE AT BROOKNEAL WAS 8 11 CFS (6.37 FT.) AND AT ALTAVISTA 813 CFS (3.25 FT.) .

Public Safety Concerns

RRBROM Model Results

SML Actual Level = less 2' Power Pool

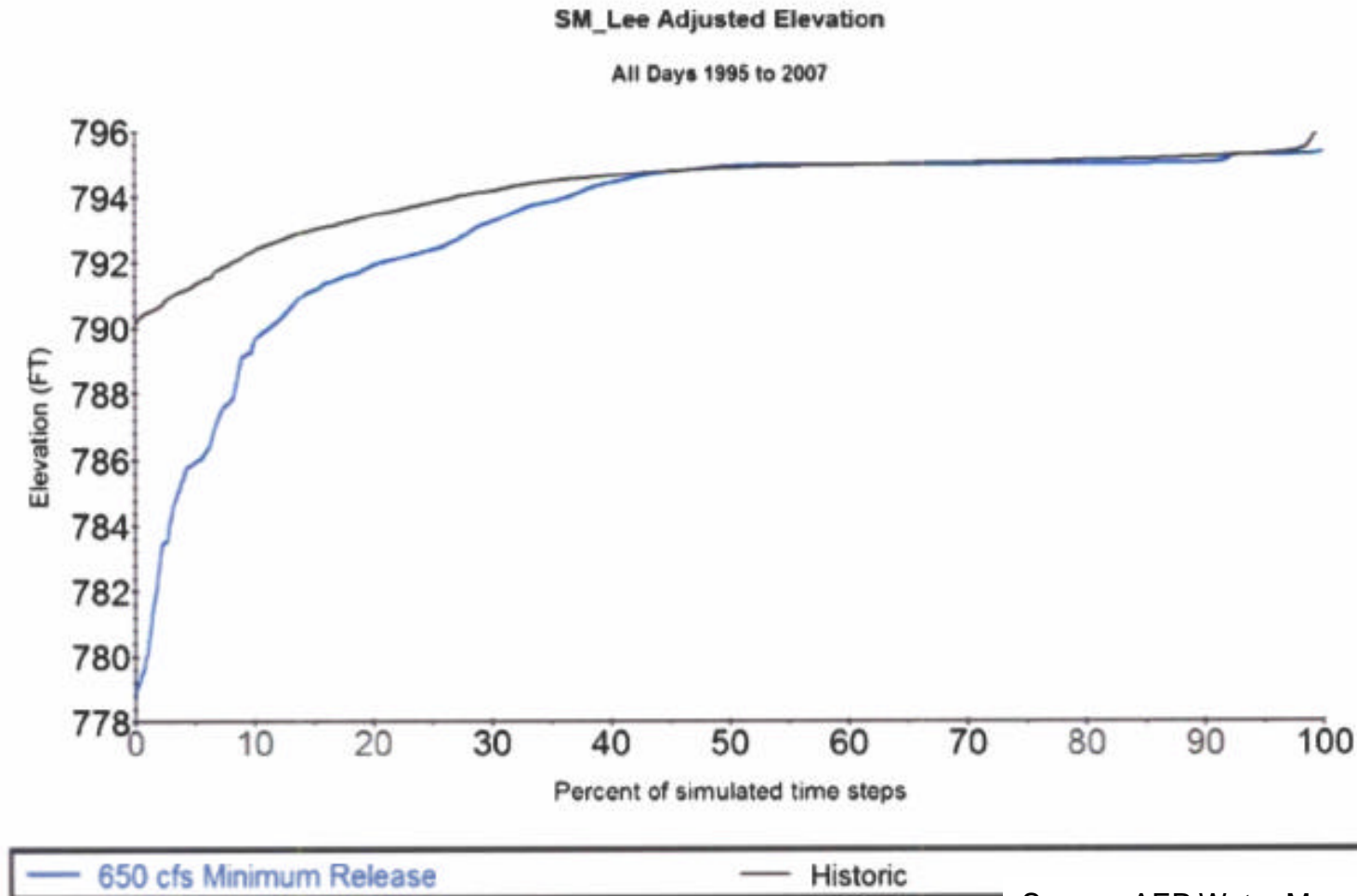


VWP Individual Permit No. 08-0572

Month	Normal		Trigger 1		Trigger 2		Trigger 3	
	cfs	≥ %*	cfs	≥ %*	cfs	≥ %*	cfs	≥ %*
Jan	1100	83%	990	86%	990	86%	770	93%
Feb	1100	88%	990	92%	990	92%	770	96%
Mar	1100	94%	935	97%	825	99%	770	99%
Apr	1500	77%	1275	90%	1200	91%	1050	N/A
May	1500	74%	1275	78%	1200	78%	1050	N/A
Jun	900	78%	765	84%	765	84%	630	N/A
Jul	700	75%	595	79%	560	82%	490	N/A
Aug	650	66%	570	72%	570	72%	420	N/A
Sep	550	75%	550	75%	550	75%	385	N/A
Oct	600	75%	570	76%	570	76%	420	N/A
Nov	700	80%	595	87%	560	89%	490	N/A
Dec	800	84%	720	88%	720	88%	560	95%

* Probability flows equal to or greater than

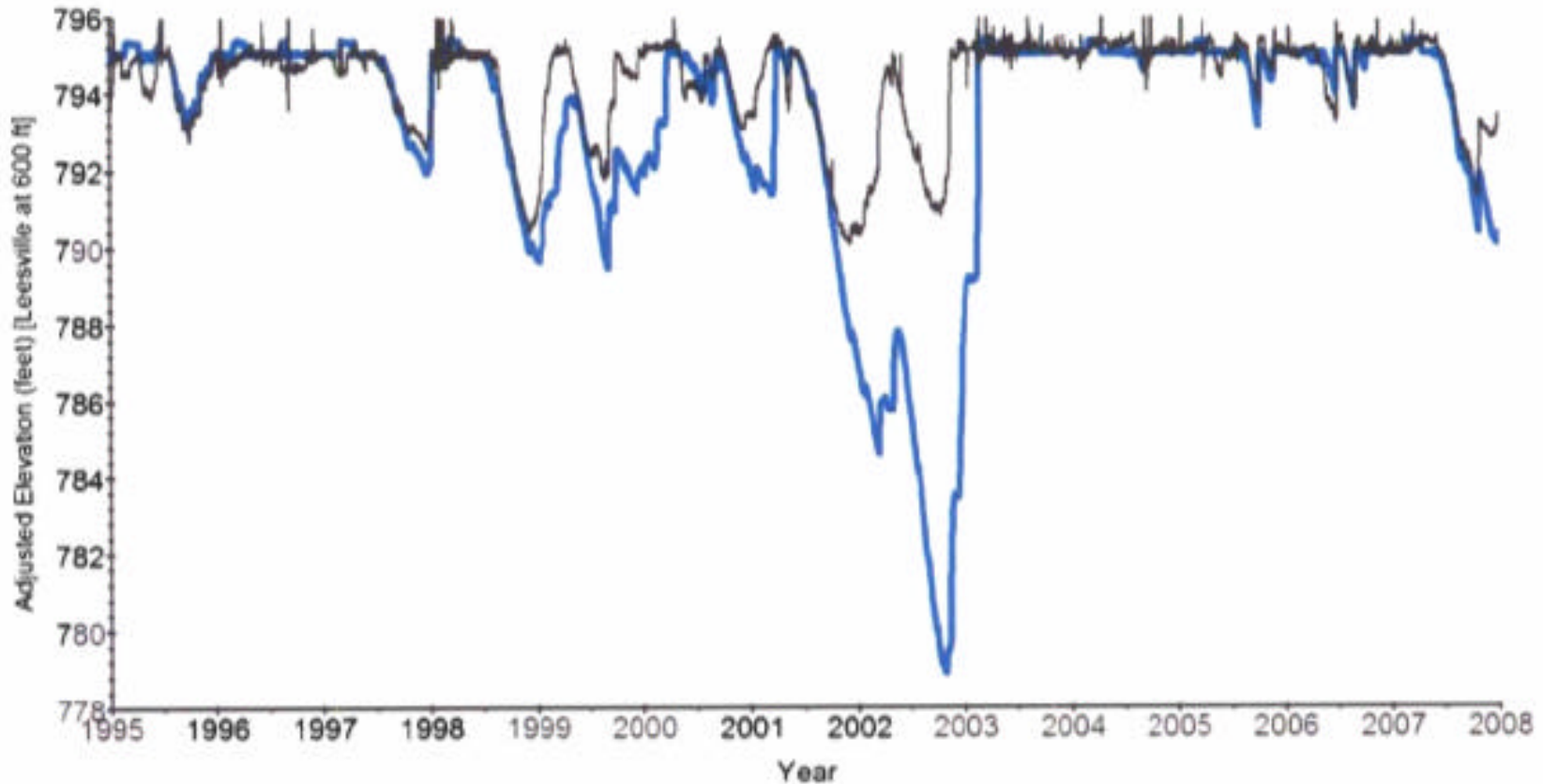
How Bad Could it Be



Source: AEP Water Management Plan

Article 29 Did Not Work

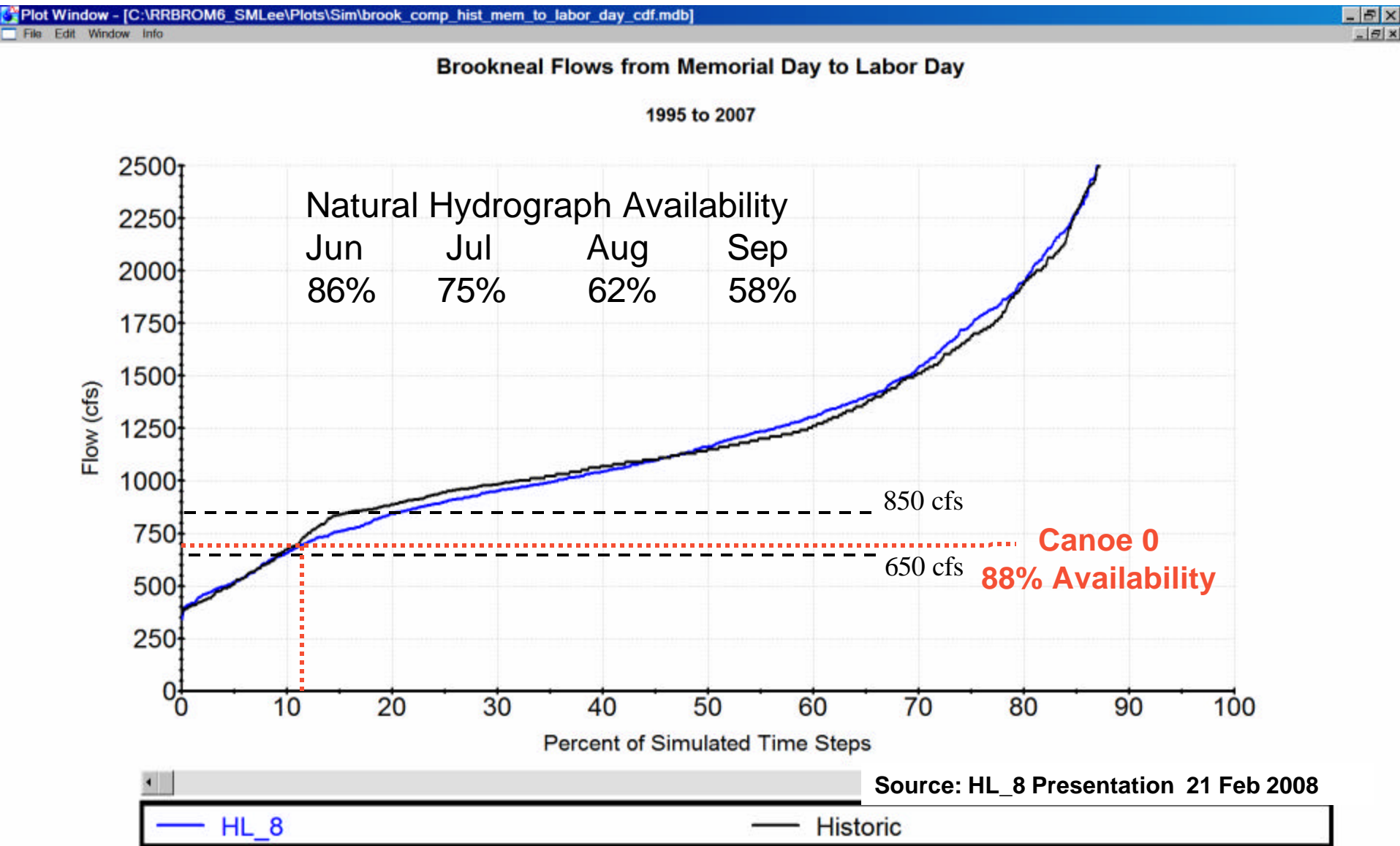
SM_Lee Adjusted Elevation



Source: AEP Water Management Plan

Canoeing thru Hale Islands

Includes weekend days and weekdays

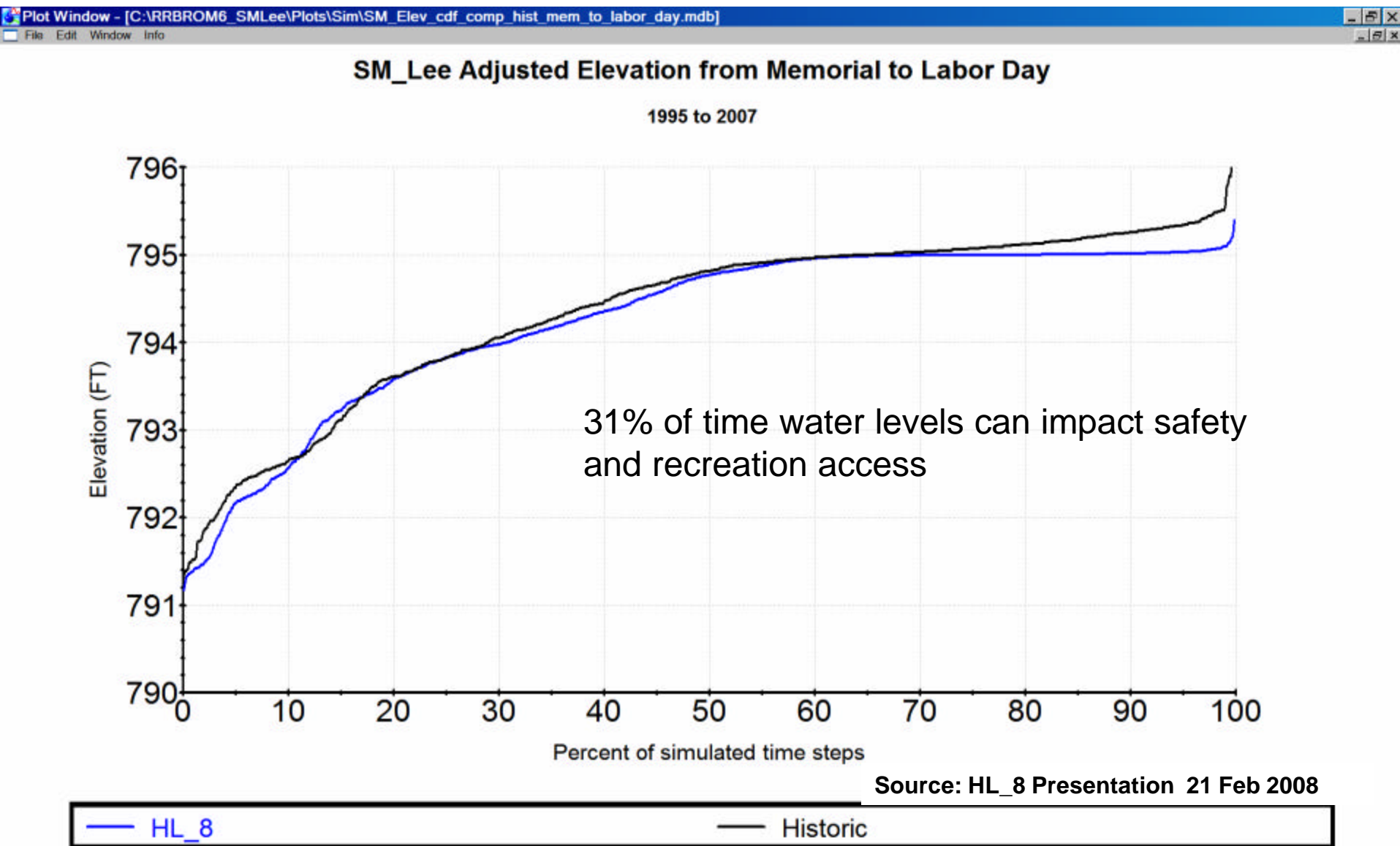


Randy Carter System of Gauging

Zero water level is the lowest a competent boater can run the river without having to get out. This is called the Randy Carter system of gauging or a "boaters' gauge". The upper level of a river's "runnability" is up to individual skill levels. We don't run any trips on the James River when it is over four feet on the boaters' gauge (approximately 6.0 feet on the U.S.G.S. Buchanan gauge) or on the Maury River when it is over three and a half feet over the boaters' gauge (approximately 4.9 feet on the U.S.G.S. Buena Vista gauge). We won't put a boat on the river by itself when the combined air and water temperature is under 100 degrees or when the water temperature in the James is under 55 degrees, the Maury 50 degrees.

Source: <http://www.canoevirginia.com/info.html>

SML Recreation Season Impacts

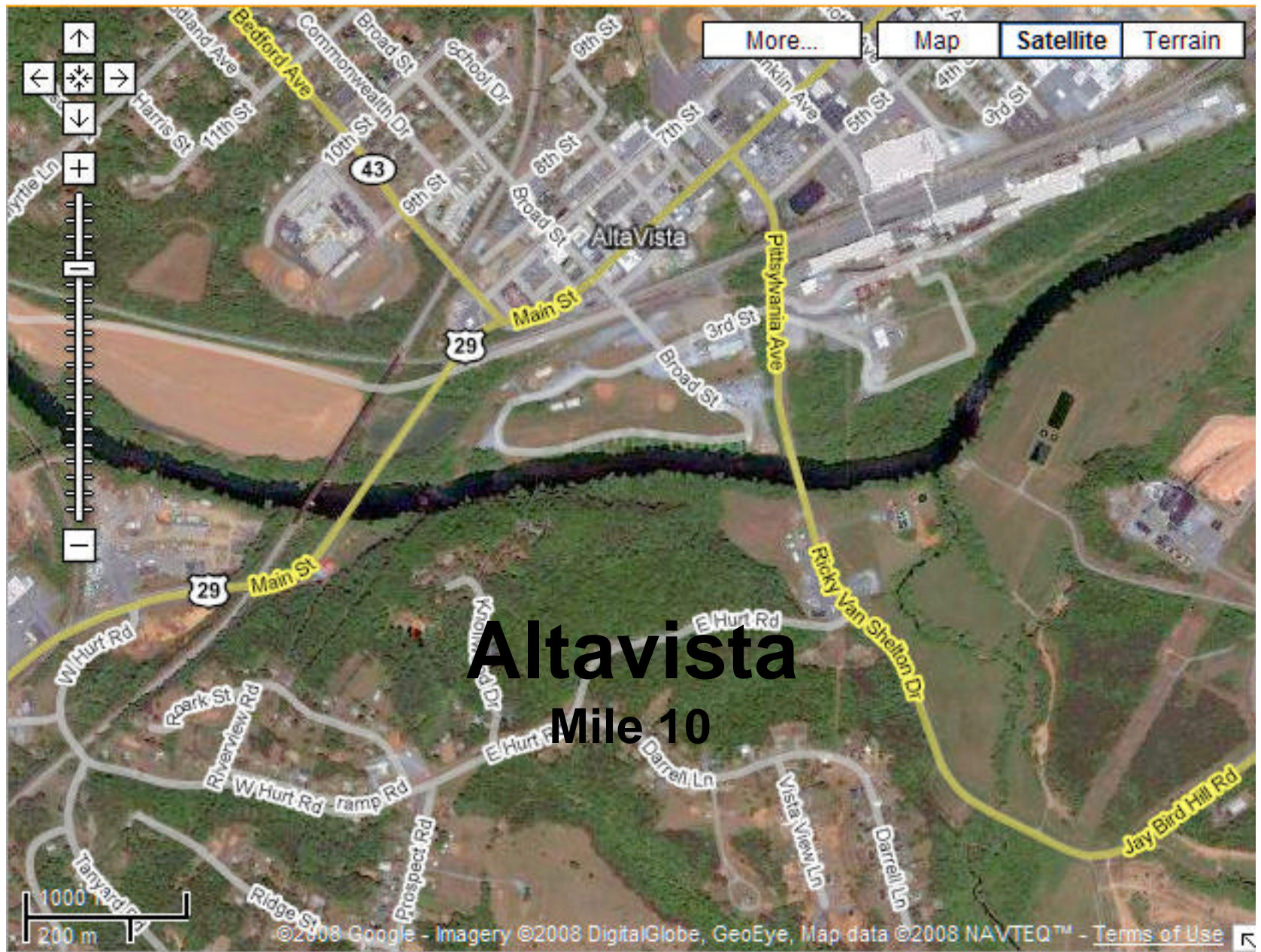


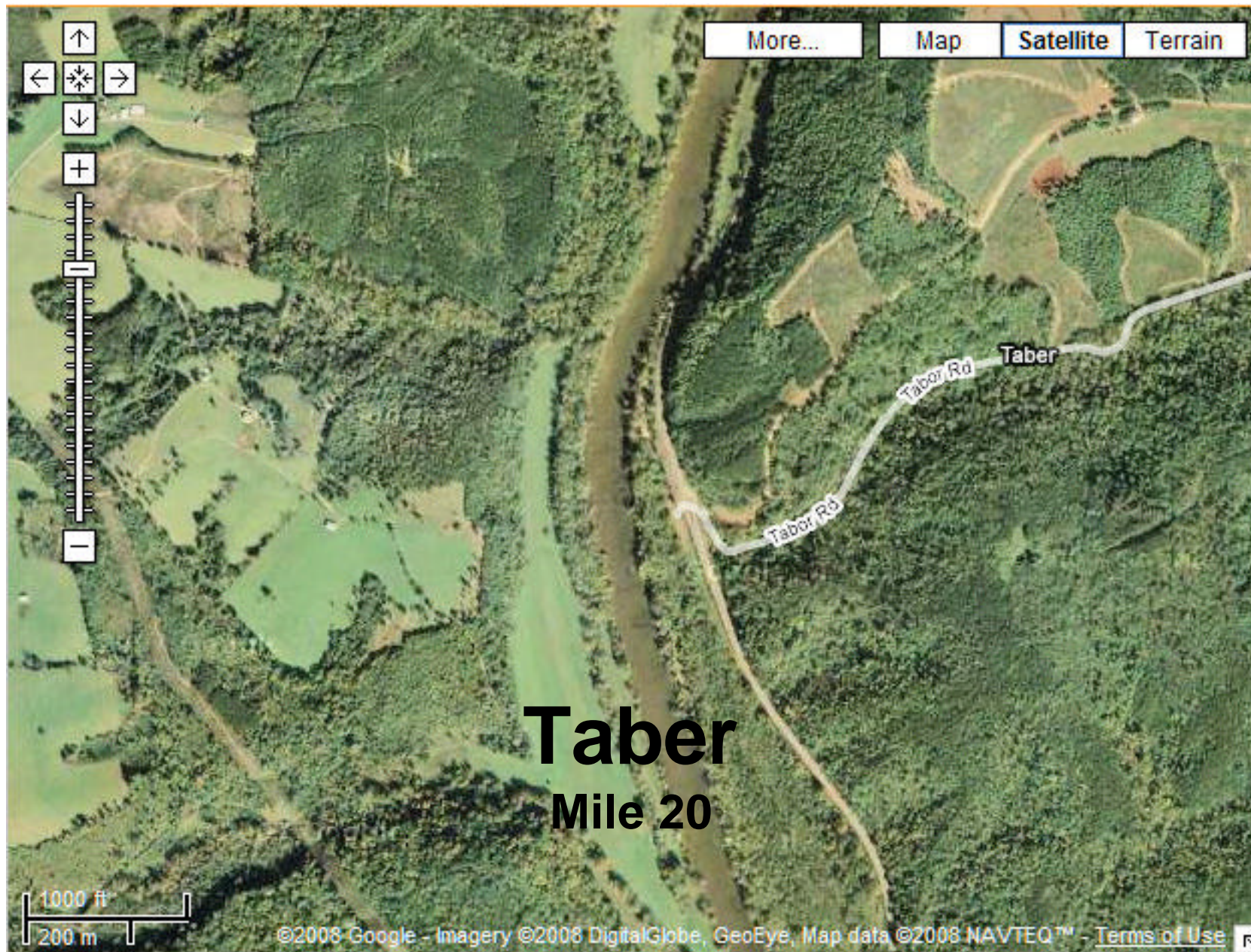


Blocked Millrace Sluice

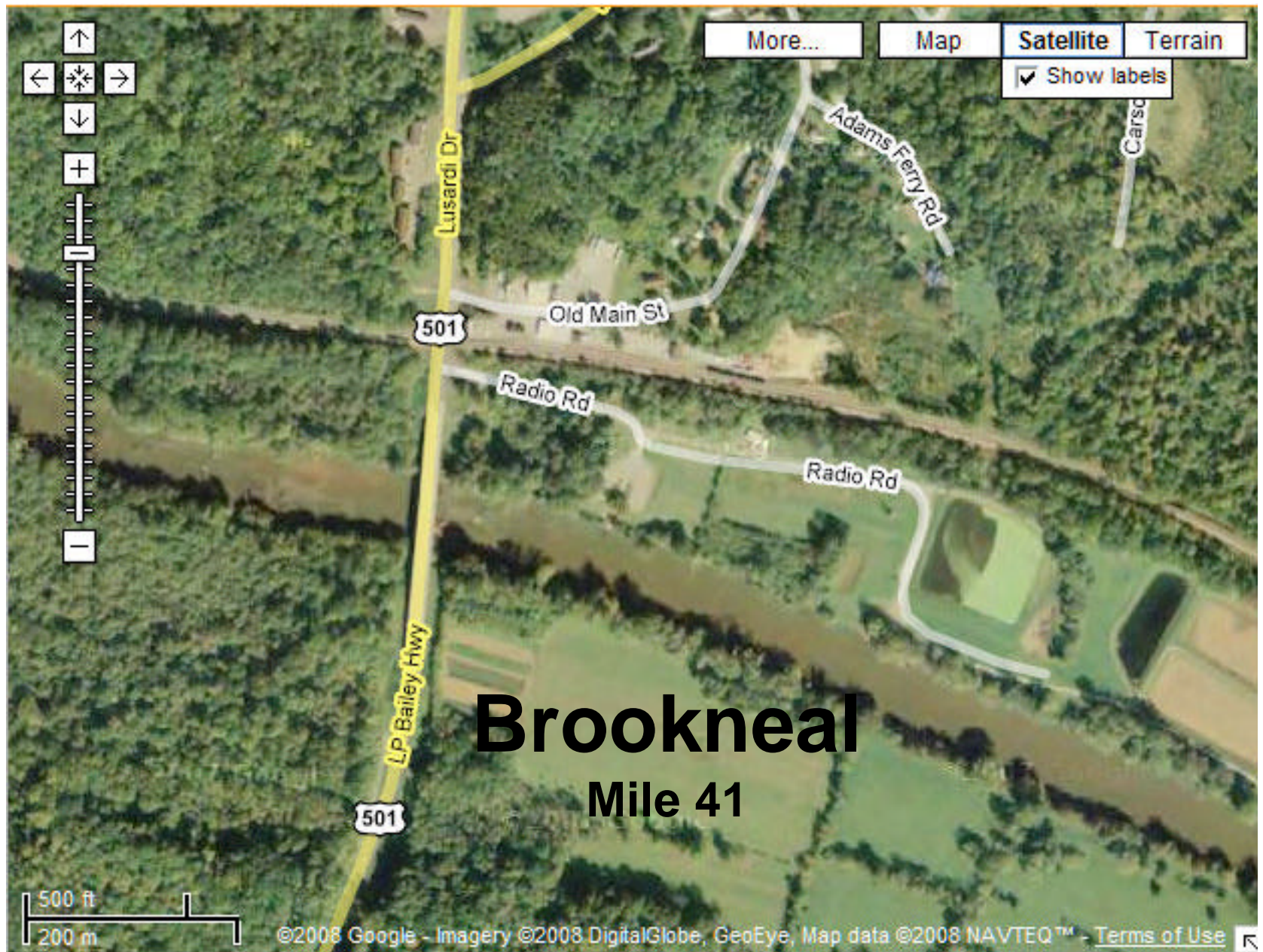








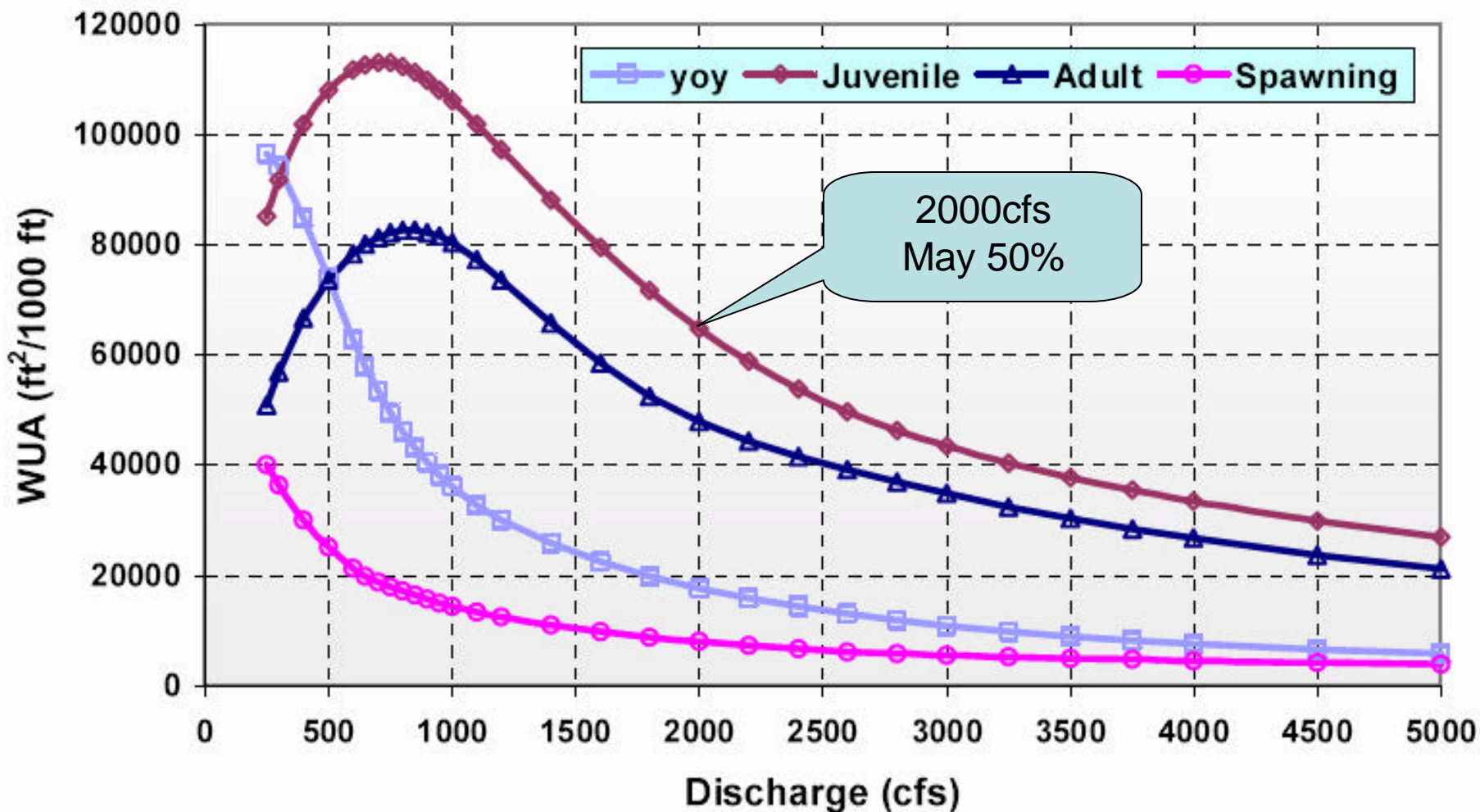






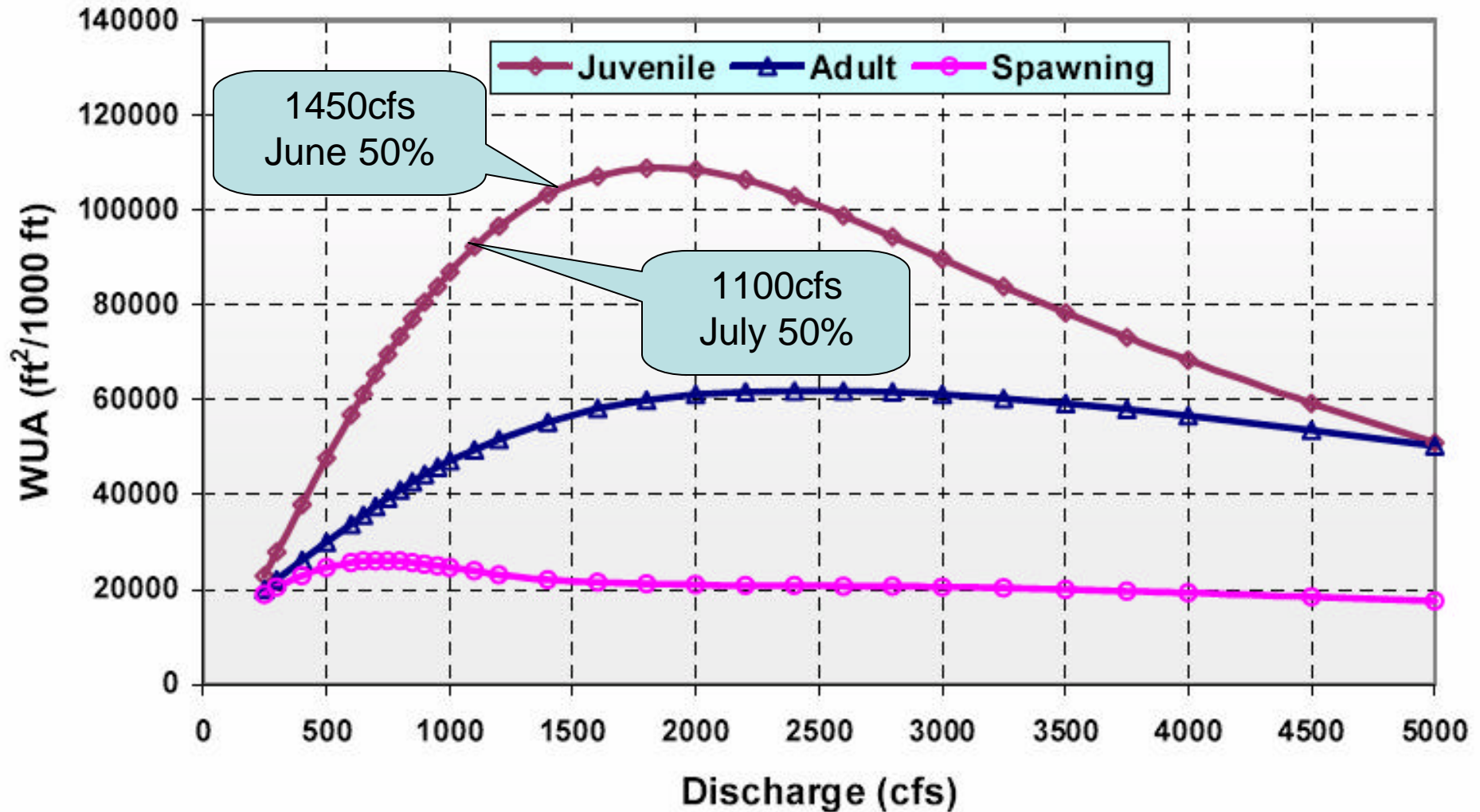
Spawning Month May

Smallmouth Bass



Spawning Months June & July

Channel Catfish



Source: Final Instream Flow Study 8-8-2007

Recommendations

1. To Address Habitat Concerns ...

– Stream flow:

- Move to continuous release from Leesville**
- Mimic natural hydrograph with releases**
- Striper release IAW DGIF floor**

2. To Address Safety Concerns ...

– Project levels:

- Safety floor of 792' actual on SML**
- Protracted low flow periods 791' actual**

From: 4-15-08 VARRBAC

Recommendations (cont.)

3. To address recreation needs below project ...

Recreational releases of 650cfs:

- Striper Festival; Memorial Day; Float Day; July 4th; Labor day
- Additional times when actual project level $\geq 792'$
 - Weekend 2 day releases = .62' project level
 - Weekend 3 day releases = .93' project level
 - Continuous releases = 2.48' project level

Improve river access:

- Clear log jam in Millrace Sluice (North channel)
- Add access at Goose Creek; Taber; Melrose and Little River Channel @ Long Island (bateaux passage in South Channel)